

DATA EVALUATION RECORD

1. **CHEMICAL:** Oxine Copper (Copper 8-Quinolinolate).
Shaughnessey Number: 024002.
2. **TEST MATERIAL:** Ro 17-0099/000; Copper 8-Quinolinolate;
bis-(8-quinolinolato)-copper; Batch No. 8293/3; 99.5%
purity; a dark green/yellow powder.
3. **STUDY TYPE:** 71-2. Avian Dietary LC₅₀ Test.
Species Tested: Bobwhite quail (*Colinus virginianus*).
4. **CITATION:** Hakin, B., M.H. Rodgers and I. Grützner. 1991.
Ro 17-0099/000 (Copper 8-Quinolinolate): Dietary Toxicity
(LC₅₀) to Bobwhite Quail. Study performed by Huntingdon
Research Centre Ltd., Huntingdon, Cambridgeshire, England,
and RCC UMWELTCHEMIE AG, Itingen, Switzerland. Laboratory
Study No. HLR 187-901685/RCC 279854. Submitted by La
Quinoleine et ses dérivés, S.A. EPA MRID No. 429271-03.
5. **REVIEWED BY:**

Michael L. Whitten, M.S.
Wildlife Toxicologist
KBN Engineering and
Applied Sciences, Inc.

Signature: *Michael L. Whitten*
Date: *1/5/94 Joseph Sykes*
4/5/95
6. **APPROVED BY:**

Mark A. Mossler, M.S.
Associate Scientist
KBN Engineering and
Applied Sciences, Inc.

Signature: *Mark A. Mossler*
Date: *1/5/94*

James J. Goodyear, Ph.D.
Project Officer, EEB/EFED
USEPA

Signature: *James J. Goodyear*
Date: *4/14/95*
7. **CONCLUSIONS:** This study is scientifically sound and meets
the requirements of an avian LC₅₀ study. With an LC₅₀ of
3428 ppm (nominal concentration), the test material is
classified as slightly toxic to the bobwhite quail. The
NOEC was 1300 ppm.
8. **RECOMMENDATIONS:** N/A.
9. **BACKGROUND:**



10. DISCUSSION OF INDIVIDUAL TESTS: N/A.11. MATERIALS AND METHODS:

- A. Test Animals: Bobwhite quail (*Colinus virginianus*) were obtained from a commercial supplier in Cambridgeshire, England, and were phenotypically indistinguishable from wild birds. The birds were acclimated to the facilities for 3 days, and were 14 days of age at test initiation.
- B. Test System: Birds were housed indoors in wooden pens fitted with wire mesh lids. Artificial lights provided 24 hours of light per day. The average minimum and maximum temperatures during the study were $25 \pm 0.7^{\circ}\text{C}$ and $28 \pm 0.9^{\circ}\text{C}$, respectively, with a mean relative humidity of $52 \pm 5\%$.
- C. Dosage: Eight-day dietary LC_{50} test. Nominal dietary concentrations were 163, 325, 650, 1300, 2600, and 5200 parts per million (ppm). The dietary concentrations refer to nominal concentrations of the test material as supplied, with no adjustment made for purity.
- D. Design: Ten birds were assigned to each of six treatment groups and three control groups. The birds were assigned to treatment groups based on bodyweight, with the goal of similar mean bodyweights in each group. No attempt was made to determine the sex of the birds. Standard HRC chick diet was used as the basal diet. Food and water were supplied *ad libitum* during acclimation and during the test.

The test diets were prepared by mixing the test substance into the diet to form a premix from which the six treatment group diets were formulated. The diets were prepared on the day of test initiation, and maintained at room temperature during the test. The birds were fed the appropriate dietary concentrations for five days, and then given untreated food during a three-day recovery period.

Samples of the diets were taken to verify the test concentrations and to confirm the stability and homogeneity of the test substance in the diets. The samples were analyzed using high performance liquid chromatography.

All birds were observed daily for mortalities, signs of toxicity, and abnormal behavior. Group mean bodyweights were measured on days -3, 0, 5, and 8. Group food

consumption was determined for the 3-day acclimation period, daily during the treatment period, and for the 3-day recovery period.

Macroscopic post mortem examinations were conducted on all birds that died during the study, and on ten birds from the highest surviving treatment groups at study termination.

E. **Statistics:** The LC_{50} and 95% confidence interval were calculated using probit analysis.

12. **REPORTED RESULTS:** Analyses of diet samples indicated that the test material was uniformly mixed, and stable in the diet for at least 5 days. Concentrations of test material were within the range of 98.0 to 104.3% of nominal values.

There were no mortalities in the control group. All birds in the control group remained in good health throughout the study.

There was 20% mortality in the 2600 ppm group, and 90% mortality in the 5600 ppm group (Table 1, attached).

Abnormal behavior was observed only in the 5600 ppm group. In this group, one bird was subdued and unsteady on day 2. One or both of these signs were noted in the remaining 5600 ppm birds from day 3 through day 5.

During days 1 to 5, bodyweight was reduced in the 5600 ppm group. When compared to controls, during the same period bodyweight gain in the 2600 ppm group was reduced (Table 2, attached). Food consumption was also reduced in these two groups (Table 3, attached).

No abnormalities were noted at necropsy.

13. **STUDY AUTHOR'S CONCLUSIONS/QUALITY ASSURANCE MEASURES:** The dietary LC_{50} was 3428 ppm with 95% confidence limits of 2616 and 4527 ppm. The no-effect-level was 1300 ppm.

The report contained statements certifying that the study was inspected by the laboratory's Quality Assurance department. The GLP statement was as follows: "The submitter of this study was neither the sponsor of this study nor conducted it, and does not know whether it has been conducted in accordance with 40 CFR Part 160."

14. **REVIEWER'S DISCUSSION AND INTERPRETATION OF STUDY RESULTS:**

- A. **Test Procedure:** The test procedures were in accordance with Subdivision E, ASTM, and SEP guidelines with the following exceptions:

The birds were not randomly assigned to groups. Instead, the assignments were based on bodyweight, with the goal of similar mean bodyweights in each group.

Body weights were measured by group after the initial weighing. Individual body weights should have been measured at each weighing interval.

Pen dimensions were not specified.

- B. **Statistical Analysis:** Using EPA's Toxanal program, the LC_{50} was 3428 ppm, the same value as reported by the authors. The 95% confidence interval (2619 to 4530 ppm) was similar to the value reported by the authors (2616 to 4527 ppm). The slope of the probit curve was 7.2.

- C. **Discussion/Results:** The birds were not randomly assigned to groups. Instead, the assignments were based on bodyweight, with the goal of similar mean bodyweights in each group. This method of assignment probably did not affect the outcome of the test. The registrant, however, should enact procedures in future tests that provide random assignments to groups.

Bodyweight gain in the 1300 ppm group was slightly less than in the controls during the test. However, bodyweight gain was also slightly less than in the controls during the acclimation period. For this reason, and since the bodyweight gain in the 1300 ppm group is within the normal range of values, no treatment-effect is inferred. Thus, using nominal concentrations, the NOEC was 1300 ppm.

With an LC_{50} of 3428 ppm (nominal concentration), the test material is classified as slightly toxic to the bobwhite quail. The NOEC was 1300 ppm. The study is scientifically sound and meets the requirements of an avian LC_{50} study.

- D. **Adequacy of the Study:**

(1) **Classification:** Core.

(2) **Rationale:** N/A.

MRID No. 429271-03

(3) Repairability: N/A.

15. COMPLETION OF ONE-LINER: Yes; December 21, 1993.

DER MRLD# 429271-03 OXINE COPPER

Page _____ is not included in this copy.

Pages 6 through 8 are not included in this copy.

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M.L. WHITTEN OXINE COPPER *Colinus virginianus* 12-21-93

CONC.	NUMBER EXPOSED	NUMBER DEAD	PERCENT DEAD	BINOMIAL PROB. (PERCENT)
5200	10	9	90	1.074219
2600	10	2	20	5.46875
1300	10	0	0	9.765625E-02
650	10	0	0	9.765625E-02
325	10	0	0	9.765625E-02
163	10	0	0	9.765625E-02

THE BINOMIAL TEST SHOWS THAT 1300 AND 5200 CAN BE USED AS STATISTICALLY SOUND CONSERVATIVE 95 PERCENT CONFIDENCE LIMITS, BECAUSE THE ACTUAL CONFIDENCE LEVEL ASSOCIATED WITH THESE LIMITS IS GREATER THAN 95 PERCENT.

AN APPROXIMATE LC50 FOR THIS SET OF DATA IS 3462.842

RESULTS CALCULATED USING THE MOVING AVERAGE METHOD

SPAN	G	LC50	95 PERCENT CONFIDENCE LIMITS
2	.1677541	3391.846	2652.166 4828.57

RESULTS CALCULATED USING THE PROBIT METHOD

ITERATIONS	G	H	GOODNESS OF FIT PROBABILITY
13	.3655713	1	.9999699

SLOPE = 7.15259
95 PERCENT CONFIDENCE LIMITS = 2.827956 AND 11.47722

LC50 = 3428.341
95 PERCENT CONFIDENCE LIMITS = 2618.989 AND 4530.452

LC10 = 2277.853
95 PERCENT CONFIDENCE LIMITS = 1130.294 AND 2892.955

Ecological Effects Branch One-Linear Data Entry Form

Chemical Oxine Copper Shaughnessy No. 024002 Pesticide Use Fungicide

AVIAN ORAL TOX SPECIES (AGE)	% AI	LD ₅₀ (95%CL)	SLOPE	NOEL	STUDY/REVIEW DATES	MRID/ CATEGORY	LAB	RC
1.								
2.								
3.								
4.								
5.								
AVIAN DIETARY SPECIES (AGE)	% AI	LC ₅₀ (95%CL)	SLOPE	NOEL/C	STUDY/REVIEW DATES	MRID/ CATEGORY	LAB	RC
1. <u>Colinus virginianus</u> <u>14 days-old</u>	99.5	3248 ppm* (2619-4530)	7.2	1300 ppm*	1991 / 1993	429271-03 CORE	HRC	MLW
2.								
3.								
4.								
5.								

COMMENTS: * - based on nominal concentrations